

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1 (currently amended): A method of producing an antireflection-coated substrate comprising a transparent substrate (1) and an antireflection film formed on the transparent substrate, the antireflection film comprising a multilayer film having a medium refractive index layer (2), a high refractive index layer (3), and a low refractive index layer (4) successively formed on the transparent substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the antireflection film being formed by successively depositing these layers by an in-line sputtering apparatus.

2. (currently amended): A method according to claim 1, wherein the antireflection film is formed by ~~sputtering or reactive sputtering in an inactive gas atmosphere or~~ in a mixed gas atmosphere comprising an inactive gas and an oxygen gas, the medium refractive index layer being deposited by the use of target (10) made of a material comprising silicon and tin, the high refractive index layer being deposited by the use of a target (11) made of a material comprising one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being deposited by the use of a target (12) made of a material comprising silicon.

3. (original): A method according to claim 2, wherein each of the medium refractive index layer, the high refractive index layer, and the low refractive index layer is deposited by the use of a plurality of targets.

4. (original): A method according to claim 1, wherein the medium refractive index layer has a refractive index between 1.6 and 1.8 and a geometrical thickness between 60 nm and 90

nm, the high refractive index layer having a refractive index between 2.1 and 2.8 and a geometrical thickness between 90 nm and 130 nm, the low refractive index layer having a refractive index between 1.4 and 1.46 and a geometrical thickness between 80 nm and 100 nm.

5. (original): A method according to claim 4, wherein the medium refractive index layer comprises $\text{Si}_x\text{Sn}_y\text{O}_z$, the high refractive index layer comprising a material selected from a group consisting of TiO_2 , Nb_2O_5 , Ta_2O_5 , and HfO_2 , the medium refractive index layer comprising SiO_2 .

6. (original): A method according to claim 1, wherein the transparent substrate is a glass substrate having a refractive index between 1.46 and 1.53.

7. (original): A method according to claim 6, wherein an antireflection-coated surface of the glass substrate on which the antireflection film is formed has a surface roughness of 0.5 nm or less as a center-line-mean roughness Ra.

8. (currently amended): A method according to claim 1 of producing an antireflection-coated substrate comprising a transparent substrate and an antireflection film formed on the transparent substrate, the antireflection film comprising a multilayer film having a medium refractive index layer, a high refractive index layer, and a low refractive index layer formed on the transparent substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the antireflection film being formed by successively depositing these layers by an in-line sputtering apparatus, wherein a transparent conductive film is formed between the high refractive index layer and the low refractive index layer.

9. (original): A method according to claim 1, wherein the antireflection-coated substrate is a dust-proof substrate for a liquid crystal panel.

10. (currently amended): A method according to claim 9, wherein the liquid crystal panel is a liquid crystal panel for a liquid crystal projector ~~of a projection type~~.

11. (original): A method according to claim 1, wherein the antireflection-coated substrate is a cover glass for a solid-state image pickup device.

12. (new): A method of producing a dust-proof substrate for a liquid crystal panel which is used in a liquid crystal projector, said dust-proof substrate comprising a glass substrate and an antireflection film formed on the glass substrate, said method comprises the steps of:

preparing the glass substrate having a glass surface which has a surface roughness of 0.5 nm or less as a center-line-mean roughness Ra; and

forming the antireflection film comprising a multilayer film having a medium refractive index layer, a high refractive index layer, and a low refractive index layer successively formed on said glass surface of the glass substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the antireflection film being formed by successively depositing the medium refractive index layer, the high refractive index layer, and the low refractive index layer by an in-line sputtering apparatus.

13. (new): A method according to claim 12, further comprising the step of:
cutting into the dust-proof substrate of a predetermined size the glass substrate and the antireflection film comprising the multilayer film formed on the glass substrate.

14. (new): A method according to claim 12, wherein the medium refractive index layer has a refractive index between 1.6 and 1.8 and a geometrical thickness between 60 nm and 90 nm, the high refractive index layer having a refractive index between 2.1 and 2.8 and a geometrical thickness between 90 nm and 130 nm, the low refractive index layer having a refractive index between 1.4 and 1.46 and a geometrical thickness between 80 nm and 100 nm.

15. (new): A method according to claim 14, wherein the dust-proof substrate has a transmittance of 95% or more in a visible range between 430 and 650 nm and has a reflectance of 0.5% or less in a film surface of the antireflection film in the visible range between 430 and 650 nm.

16. (new): A method of producing a cover glass for a solid-state image pickup device, said cover comprising a glass substrate and an antireflection film formed on the glass substrate, said method comprises the steps of:

preparing the glass substrate having a glass surface which has a surface roughness of 0.5 nm or less as a center-line-mean roughness Ra;

forming the antireflection film comprising a multilayer film having a medium refractive index layer, a high refractive index layer, and a low refractive index layer successively formed on said glass surface of the glass substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the antireflection film being formed by successively depositing the medium refractive index layer, the high refractive index layer, and the low refractive index layer by an in-line sputtering apparatus; and

cutting into the cover glass of a predetermined size the glass substrate and the antireflection film comprising the multilayer film formed on the glass substrate.

17. (new): A dust-proof substrate for a liquid crystal panel which is used in a liquid crystal projector, said dust-proof substrate comprising a glass substrate and an antireflection film formed on the glass substrate, wherein:

said glass substrate having a glass surface on which the antireflection film is formed, said glass surface having a surface roughness of 0.5 nm or less as a center-line-mean roughness Ra;

said antireflection film comprising a multilayer film having a medium refractive index layer, a high refractive index layer, and a low refractive index layer successively formed on the glass substrate in this order, the medium refractive index layer being made of a material comprising silicon, tin, and oxygen, the high refractive index layer being made of a material comprising oxygen and at least one element selected from a group consisting of titanium, niobium, tantalum, and hafnium, the low refractive index layer being made of a material comprising silicon and oxygen, the medium refractive index layer having a refractive index between 1.6 and 1.8 and a geometrical thickness between 60 nm and 90 nm, the high refractive

index layer having a refractive index between 2.1 and 2.8 and a geometrical thickness between 90 nm and 130 nm, the low refractive index layer having a refractive index between 1.4 and 1.46 and a geometrical thickness between 80 nm and 100 nm;

the dust-proof substrate having a transmittance of 95% or more in a visible range between 430 and 650 nm and having a reflectance of 0.5% or less in a film surface of the antireflection film in the visible range between 430 and 650 nm.

18. (new): A dust-proof substrate according to claim 17, wherein the medium refractive index layer comprises $\text{Si}_x\text{Sn}_y\text{O}_z$, the high refractive index layer comprising a material selected from a group consisting of TiO_2 , Nb_2O_5 , Ta_2O_5 , and HfO_2 , the low refractive index layer comprising SiO_2 .

19. (new): A dust-proof substrate according to claim 18, wherein the glass substrate is a glass substrate having a refractive index between 1.46 and 1.53.

20. (new): A liquid crystal panel for a liquid crystal projector, comprising a liquid crystal layer, a drive substrate, and an opposite substrate, said drive substrate and said opposite substrate being arranged opposite to each other for holding and driving said liquid crystal layer with said liquid crystal layer interposed between said drive substrate and said opposite substrate, wherein a dust-proof substrate according to claim 17 is bonded to an outer surface of at least one of the drive substrate and the opposite substrate.